Numerical simulation and experimental study of thrust air bearings with multiple orifices

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Mots-clés	Dynamic analysis [5], Experimental study [6], finite element method [7], Thrust air bearing [8]
Résumé en anglais	The objective of this paper is to provide a numerical simulation and an experimental study in order to assess stiffness and damping characteristics of thrust air bearings with multiple orifices. Finite element modeling is used to solve the non-linear Reynolds equation while taking into account the movement equation for the bearing. The numerical results obtained show that performance characteristics are related to bearing design type. An experimental investigation allows us to analyze the behavior of thrust air bearings with several orifices as well as that of groove or porous material bearings. Frequency response measurements have been realized in order to compare the dynamic properties of the different bearings. The frequency responses obtained demonstrate that air bearings with multiple orifices have a damping higher than the other types in certain conditions. Air bearings with multiple orifices offer many advantages from a dynamic point of view. Their performance may be characterized not only by flow conditions but also by the number or diameter of the orifices in the bearing surface.
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